

**Claims**

What is Claimed is:

1. A process for the production of polyurethane di(meth)acrylates in which  
5 1,6-hexane diisocyanate is reacted, without solvent and without subsequent  
purification operations, with a diol component and hydroxy-C2-C4-alkyl  
(meth)acrylate in the molar ratio  $x : (x-1) : 2$ , wherein  $x$  means any desired  
value from 2 to 5 and the diol component is a combination of two to four  
(cyclo)aliphatic diols with molar masses of 62 to 600 and wherein each of the  
10 diols constitutes at least 10 mol% of the diols of the diol component.
2. The process of claim 1, wherein the diols of the diol component are  
selected from the group consisting of ethylene glycol, the isomeric propane-  
and butanediols, 1,5-pentanediol, 1,6-hexanediol, 1,10-decanediol, 1,12-  
15 dodecanediol, neopentyl glycol, butylethylpropanediol, the isomeric  
cyclohexanediols, the isomeric cyclohexanedimethanols, hydrogenated  
bisphenol A, tricyclodecanedimethanol and dimer fatty alcohol.
3. The process of claim 1, wherein the diol component is selected from  
20 the group consisting of combinations of 20 to 80 mol% hydrogenated  
bisphenol A with 80 to 20 mol% 1,10-decanediol, 20 to 80 mol%  
hydrogenated bisphenol A with 80 to 20 mol% 1,6-hexanediol, 60 to 90 mol%  
neopentyl glycol with 40 to 10 mol% 1,6-hexanediol, 10 to 90 mol%  
cyclohexanedimethanol with 90 to 10 mol% 1,5-pentanediol and three-  
25 component combinations comprising in each case 10 to 50 mol% 1,3-  
propanediol, 1,5-pentanediol and 1,6-hexanediol and in each case 10 to 50  
mol% 1,3-propanediol, 1,5-pentanediol and cyclohexanedimethanol, wherein  
the mol percentages add up to 100 mol% in each of the combinations.
- 30 4. Polyurethane di(meth)acrylates produced using the process of claim 1.
5. Polyurethane di(meth)acrylates produced using the process of claim 2.

6. Polyurethane di(meth)acrylates produced using the process of claim 3.
7. Powder coating compositions containing the polyurethane di(meth)acrylates produced according to the process of claim 1 as binder.
- 5 8. Powder coating compositions containing the polyurethane di(meth)acrylates produced according to the process of claim 2 as binder.
9. Powder coating compositions containing the polyurethane di(meth)acrylates produced according to the process of claim 3 as binder.
- 10 10. A substrate coated with a layer of the powder coating composition according to claim 7.